

REMARKS

The Present Invention

The present invention relates to a polishing system and composition for use in polishing a substrate, particularly a multi-layer substrate that includes a first metal layer and a second layer. Claims 1-6, 8, 9, 16-27, and 32-35 currently are pending. Applicants note that claim 2 was previously withdrawn from consideration as being directed to a non-elected species; however, in view of the fact that the Office Action sets forth a substantive rejection of claim 2, Applicants discuss claim 2 herein as though such claim has not been withdrawn from consideration by the Office.

Summary of the Office Action

The Office Action rejects the pending claims under 35 U.S.C. § 103(a) as allegedly unpatentable over the combination of U.S. Patent 5,783,489 (Kaufman et al.) (hereinafter "the Kaufman '489 patent") and U.S. Patent 5,770,095 (Sasaki et al.) (hereinafter "the Sasaki '095 patent"), alone or in further view of U.S. Patent 5,897,375 (Watts et al.) (hereinafter "the Watts '375 patent"), U.S. Patent 5,972,792 (Hudson) (hereinafter "the Hudson '792 patent"), U.S. Patent 6,096,652 (Watts et al.) (hereinafter "the Watts '652 patent"), U.S. Patent 5,709,588 (Muroyama) (hereinafter "the Muroyama '588 patent"), or U.S. Patent 4,968,381 (Prigge et al.) (hereinafter "the Prigge '381 patent").

Discussion of the Section 103 Rejections

The present invention, as defined by the pending claims, involves the use of (i) a liquid carrier, (ii) an oxidizing agent, (iii) a polishing additive selected from a group of particular polishing additives, (iv) a passivation film forming agent, and (v) a polishing pad and/or an abrasive. The Office Action asserts that the Kaufman '489 patent discloses a chemical-mechanical polishing composition comprising a liquid carrier, an oxidizing agent, at least one polishing additive selected from the group recited in claim 1 of the present patent application, and an abrasive. The Office Action acknowledges that the Kaufman '489 patent does not teach or suggest a polishing composition comprising at least one passivation film forming agent, but alleges that such polishing composition would have been obvious to one of ordinary skill in the art in view of the Sasaki '095 patent, which discloses a chemical-mechanical polishing composition comprising a chemical agent that forms a protective film on a material by reacting with a metal in the material. Applicants respectfully traverse this rejection.

Contrary to the Office Action's assertions, one of ordinary skill in the art, at the time of the invention, would not have been motivated to combine the Kaufman '489 and Sasaki '095 patents in such a way as to arrive at the invention defined by the pending claims. In particular, in view of the teachings of the Kaufman '489 and Sasaki '095 patents, taken as a whole, and the knowledge generally available to those of ordinary skill in the art at the time of the invention, one of ordinary skill in the art would not have been motivated to combine a passivation film forming agent, such as disclosed in the Sasaki '095 patent, with the chemical-mechanical polishing composition disclosed in the Kaufman '489 patent.

The Kaufman '489 patent generally discloses a polishing composition comprising a liquid carrier, at least two oxidizing agents, a stabilizer (e.g., a phosphonic acid), and an abrasive (Kaufman '489 patent at col. 3, line 42 – col. 6, line 59). The Kaufman '489 patent further provides that the oxidizing agents are incorporated into the chemical-mechanical polishing composition in order to "aid in oxidizing the multiple metal layers to their corresponding oxide, hydroxide, or ions" (Kaufman '489 patent at col. 4, lines 3-17). Thus, the Kaufman '489 patent specifically provides that the disclosed chemical-mechanical polishing composition functions by oxidizing the metals contained in the substrate. The oxidized portions of the metal, which are more brittle than the non-oxidized metal, are then removed by the mechanical action of the abrasive on the substrate surface. Accordingly, the Kaufman '489 patent teaches that the disclosed chemical-mechanical polishing composition's ability to oxidize the metals contained in the substrate is essential to the proper functioning of the polishing composition.

The Sasaki '095 patent generally discloses a polishing composition comprising a chemical agent that forms a protective film on a material by reacting with a metal in the material (e.g., triazole or benzotriazole) (Sasaki '095 patent at col. 3, lines 38-65). In contrast to the Kaufman '489 patent, the Sasaki '095 patent provides that the aforementioned chemical agent is incorporated into the polishing composition in order to *suppress* the chemical polishing of the target film of the substrate (see, e.g., Sasaki '095 patent at col. 3, lines 18-26). More specifically, the disclosed chemical agent reacts with the substrate to form a film on the substrate that protects at least a portion of the substrate from the oxidizing action of the polishing composition. Therefore, the Sasaki '095 patent specifically teaches that the chemical polishing (i.e., oxidation) of the metal(s) in the substrate should be suppressed through the use of the aforementioned chemical agent (e.g., a passivation film forming agent).

Thus, the express teachings of the Kaufman '489 and Sasaki '095 patents are in direct conflict. In particular, the Kaufman '489 patent teaches that the disclosed polishing

composition functions by oxidizing the metals contained in the substrate, while the Sasaki '095 patent teaches that the chemical polishing (specifically, oxidation) of the metal(s) contained in the substrate should be suppressed through the use of a passivation film forming agent. Accordingly, one of ordinary skill in the art, at the time of the invention, would not have been motivated to combine the Kaufman '489 and Sasaki '095 patents. More specifically, one of ordinary skill in the art, having read the Kaufman '489 and Sasaki '095 patents, would not have been motivated to incorporate a passivation film forming agent into the polishing composition disclosed in the Kaufman '489 patent because the passivation film forming agent would suppress or prevent the oxidation of the metals in the substrate, which is expressly taught as being essential to the functioning of the polishing composition disclosed in the Kaufman '489 patent. Indeed, in order to find a motivation to make such a combination, one would have to completely disregard the explicit teachings contained within at least one of the cited references regarding the functioning of the polishing composition disclosed therein. The other cited references do not change that fact. In order to properly support a *prima facie* obviousness rejection, however, a proposed modification or combination of references cannot change the principle of operation of a reference. See, e.g., M.P.E.P. § 2143.02. Therefore, contrary to the Office Action's assertions, one of ordinary skill in the art, at the time of the invention, would not have been motivated to combine the Kaufman '489 and Sasaki '095 patents, much less combine the patents in such a way as to arrive at the invention defined by the pending claims.

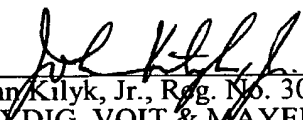
As a result, the Office Action fails to set forth a *prima facie* obviousness rejection based on the cited references. There is nothing within the references themselves or the knowledge available to those of ordinary skill in the art which would have suggested the proposed combination. Indeed, as discussed above, the combination proposed in the Office Action directly conflicts with the teachings of the cited references. The rejections under Section 103, therefore, should be withdrawn.

In re Appln. of Wang et al.
Application No. 09/636,161

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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